February 15, 2007

M E M O R A N D U M

TO: Mark Mason, DEQ Wastewater Program, Boise State Office
Richard Huddleston, State Water Quality Office, Boise State Office

FROM: Gary Gaffney

SUBJECT: Staff Analysis for the Gozzer Ranch Golf and Lake Club Reuse Permit, North Kootenai Water and Sewer District, LA-000143-01

PURPOSE

The purpose of this memorandum is to satisfy the requirements for issuing a wastewater reuse permit by preparing a staff analysis as outlined in the Application Processing Procedure in the Rules for Reclamation and Reuse of Municipal and Industrial Wastewater (IDAPA 58.01.17.400). The staff analysis needs to briefly state the principal facts and the significant questions considered in preparing the draft permit conditions and include a summary of the basis for the draft conditions with references to applicable requirements and supporting materials.

SYSTEMS DESCRIPTIONS:

Gozzer Ranch is a 375 lot residential subdivision located on about 600 acres above Arrow Point on Lake Coeur d'Alene. The project involves construction of an 18-hole golf course to be surrounded by up to 375 residential units. Information on the project and the development company, Discovery Land Company can be found at http://www.discoverylandco.com/project_gozzerranch.html

Wastewater System: The sewage system involves septic tank effluent gravity (STEG) sewage collection and wastewater treatment facility utilizing a 130,000 gallon per day (gpd) capacity Memcor Membrane Bio-Reactor (MBR) system. Besides serving the 375 lot Gozzer Ranch subdivision, the sewer system will provide sewage treatment services to the existing Arrow Point development. This lakefront development involves approximately 125 existing condominium and single-family lots with the possibility of connecting up to 170 total users in the future. The Arrow Point system currently pumps septic tank effluent to a large soil absorption system that will be abandoned once a sewer force main is connected into the Gozzer Ranch wastewater treatment plant.

Gozzer Ranch wastewater will be treated to meet Class A reuse standards as initially adopted by Idaho in 2005 with storage in a lined lagoon during the winter and summer application on selected residential areas and 122 acres of golf course. The sewer system was designed to accommodate up to 560 users consisting of 390 equivalent residents (ERs) at Gozzer Ranch and 170 ERs at Arrow Point. At ultimate build out, the system is envisioned as handling up to 48 million gallons of wastewater annually.

Since winter sewage flows are expected to be low because the project's golf amenities will create limited winter occupancies, the 7.8 million gallon storage lagoon was determined to be adequate. If actual winter flows prove to be in excess of the design consideration, additional lined lagoons will be installed.

Drinking Water: A public water system consisting of water from Lake Coeur d'Alene treated by a 420 gallon per minute (gpm) capacity slow sand filtration system has been installed to serve drinking water and fire protection to the development.

Irrigation Reuse System: A separate irrigation system supplied by lake water and Class A treated wastewater stored together as needed in a lined 7.8 million gallon (MG) golf course irrigation pond will be utilized throughout the development to irrigate a few common residential sites and the 18-hole golf course. Application rates and timing of irrigation will be managed by the golf course operators as controlled by a central computer linked by field satellite controllers to individual sprinklers.

Since the Trojan Technologies Model UV3150K-PTP UV disinfection system qualifies by itself as an acceptable disinfection process and satisfies the 5-log virus inactivation requirement in the reuse rules (IDAPA 58.01.17.601.06.c.ii), the point of compliance for Class A disinfection can be any point in the system following final treatment and disinfection contact time. This means that the operator can sample the wastewater following the UV units for total coliform bacteria compliance and does not have to operate the installed chlorination system. Since the chlorination system and residual chlorine analyzer were installed (to comply with 2005 reuse rules), DEQ recommends that these systems be operated during plant startup until it can be shown the UV system will consistently meet the bacteria standards. Operation of this redundant chlorine disinfection system might also provide the concerned public and residents assurances of the public health safety of the reused wastewater.

Ownership: North Kootenai Water and Sewer District (NKWSD) has annexed or will be annexing all of the Gozzer Ranch and Arrow Point areas into the district boundaries and assuming ownership, operation, and maintenance responsibilities for the Gozzer Ranch and Arrow Point sewage systems and for the Gozzer Ranch public drinking water system.

The existing public drinking water system (groundwater wells) serving the Arrow Point development will not be transferred to NKWSD and will remain under its current ownership entity. The two wells serving the Arrow Point public drinking water system are located vertically below the Gozzer Ranch development. Although no direct evidence has been provided connecting these wells hydraulically to the Gozzer reuse areas, it is possible that such a connection might exist. The reuse permit indicates the Idaho Ground Water Quality Rule protected these two wells for existing water quality but does not directly assign the permittee with responsibility for any future changes to water quality in the wells.

Any new sewer connections at Arrow Point and Gozzer Ranch will go through a permitting process administered by NKWSD in accordance with standard design requirements. NKWSD responsibility will extend from the inlet to each septic tank to the disinfection point of compliance for the Class A reuse standards. The Panhandle Health District will not be issuing "tank only" permits for new sewer service connections once the district implements a new connection permitting procedure.

SUMMARY OF EVENTS:

On June 24, 2005 an application as prepared by Welch Comer and Associates was submitted to DEQ for a Class A wastewater reuse permit for the Gozzer Ranch development.

On August 1, 2005 DEQ issued a letter to Discovery Land Company indicating the permit application was determined to be complete in accordance with IDAPA 58.01.17.400.01. This same letter approved construction plans and specifications for the wastewater treatment package plant facility.

On December 6, 2005 DEQ issued another letter to Discovery CDA Investors, LLC (a.k.a. Discovery Land Company) reiterating the completeness determination and providing nine comments on the content to the application. No reuse draft permit was prepared in 2005- 6.

Construction activities at Gozzer Ranch started in 2005 and are continuing to date. DEQ approval of drinking water system plans and specifications was secured in 2005 and the new water system has been completed and ready to become fully operational. Record drawings for the slow sand filtration system and an initial sanitary survey of the public drinking water system are pending.

The building housing the Memcor MBR has been completed and the package treatment plant installed. Record drawings for the treatment plant have not been provided to DEQ. Startup of the treatment plant has been scheduled for March of 2007. Once the Arrow Point sewage connection has been completed, the facility will be receiving up to 20,000 gallons per day of septic tank effluent. Although some building has been initiated in lots in Gozzer Ranch by the Discovery Land Company, these housing units are not scheduled for completion for several months.

A significant number of the golf holes have been completed and the golf course irrigation pond has been completed. The golf course irrigation system was not constructed using purple reuse piping. Lake water was pumped into the Golf Course Irrigation Pond in 2006 and used to establish completed golfing areas. Wastewater delivery to the golf course irrigation pond will be initiated once the Reuse Permit has been executed by DEQ.

WASTEWATER TREATMENT:

The wastewater system at Gozzer Ranch begins with installation of septic tanks at each residential unit and connection either by gravity (or by an individual effluent pump) into gravity effluent collection mains. Arrow Point effluent is delivered under pressure to the treatment site. The two effluent supplies are delivered into three 7200 gallon capacity equalization tanks located outside the 100-foot by 40-foot wastewater treatment building. To maintain a constant plant influent rate, wastewater from the equalization tanks is transferred by two 5 Hp 132 gpm capacity pumps to the 2 mm screening device on top of the MBR unit.

The package treatment system consists of USFilter's MemJet Model Xpress 100 Membrane Bioreactor system approved by Mark Mason of DEQ on December 5, 2005 as technology suitable for application with Class A wastewater projects. The 90-foot long pre-manufactured package treatment has been installed in the center of the existing wastewater treatment building leaving no room for installation of future treatment units inside the structure.

The MBR's Biological Treatment Process consists of a horizontal 14-foot diameter by 60 foot long cylindrical epoxy-coated steel tank containing 1/3rd anoxic and 2/3rd aerobic zones with associated recirculation pumps and aeration bubbler provisions. The tanks contain about 70,000 gallons of wastewater.

Following the biological treatment step, the Membrane Operating System involves two 4500 gallon membrane tanks each sized to treat up to 200,000 gpd and containing a total of 144 US Filter manufactured hollow fiber membrane modules with a maximum pore size of 0.1 micron. Each tank includes four membrane racks consisting of nine cloverleaf assemblies with four modules housed in each cloverleaf section. Discharge from the membranes is provided by suction pumping at up to 151 gpm from inside the hollow fiber membranes. When suction pressures exceed 4 psi, the membranes are cleaned in place (CIP) by dosing with 1200 ppm of sodium hypochlorite (or citric acid in the event of organic fouling) and eventually returning the cleaning solution to the headworks.

Waste activated sludge is purged from the bioreactor and membrane filters as necessary and stored in a 50,000 gallon capacity buried concrete sludge tank located outside of the treatment building. The Operating Plan calls for aeration of the sludge tank contents with periodic transport of the waste sludge to an approved off-site sludge disposal facility. A Waste Solids Management Plan will be required by the permit as part of the Operation and Maintenance Manual submittal for the new plant.

Turbidity will be continuously monitored of the filtrate discharged from the membrane system and prior to disinfection for compliance with the Class A turbidity standards. Class A turbidity standards for systems utilizing membrane filtration were reduced in 2006 to an arithmetic mean not exceeding 0.2 NTU for all daily measurements with no single turbidity measurement in excess of 0.5 NTU. The design engineers and equipment supplier have confirmed that this system can be expected to comply with these reduced turbidity standards.

In the event plant effluent does not meet turbidity or disinfection requirements, the Gozzer Ranch system has constructed 1 MG capacity lined lagoon adjacent to the treatment building. This Bypass Pond is capable of receiving up to seven days of the design 130,000 gpd wastewater flow from the facility. This lagoon is equipped with a return flow pump station capable of pumping the wastewater to the plant headworks once compliance with treatment standards has been re-established.

Disinfection following the membrane filtration step is done by ultraviolet radiation by Trojan Technologies UV3000 package treatment plant using three Trojan model UV3150K-PTP units all plumbed in series with two units operating and one unit as standby. Two of the ultraviolet units in operation can disinfect the design flow of 130,000 gpd. A plant sampling point is located following UV disinfection.

Treated and UV disinfected wastewater flows to an effluent pump station outside the treatment building containing two 25-Hp 260-gpm capacity pumps. The discharge from these two pumps receives chlorine disinfectant and travels about 8,280 feet for 47 minutes in a six-inch diameter C-900 PVC purple reclaimed water main prior to open discharge into the golf course irrigation storage lagoon/pond. A chlorine residual analyzer has been installed to monitor free chlorine concentrations at the irrigation pond discharge. Since the UV disinfection system is capable by itself of satisfying the Class A disinfection requirements, operation of the chlorination and residual monitoring system are not mandatory but will be encouraged to provide redundant disinfection capacity.

Class A disinfection requirements are a median number of total coliform organisms not exceeding 2.2 per 100 milliliters (ml.) and not exceeding 23 per 100 ml. in any confirmed sample based on the results from the last 7 days of completed bacteriological monitoring.

WASTEWATER REUSE

From the point of disinfection compliance, Discovery Land Company and the Golf Course Superintendent are responsible for proper use of the Class A wastewater. The permittee shall assure this responsibility is properly handled by executing a Utility User Agreement with Discovery Land Company as required by the reuse rules. Appendix A of the reuse application describes Discovery Land Company's operating plan for reuse of treated wastewater as irrigation of the golf course.

SITE CHARACTERISTICS

The application contains a copy of the "Geotechnical Engineering Evaluation Arrow Point Planned Unit Development" dated September 2, 2004 as prepared by Allwest Materials Testing and Geotechnical Engineering describing the soils and groundwater conditions at the Gozzer Ranch site.

PROJECTED WASTEWATER QUALITY AND LOADING RATES

The wastewater treatment system will produce Class A wastewater as described by the Reuse Rules. Application rates of mixed Class A and lake water to the golf course will be monitored by soil moisture probes linked to weather station data to establish necessary applications. The system will not rely on ground water aquifer recharge as a mechanism for wastewater disposal. Design of the golf course area has involved placement of 4 to 9 inches of sandy material capping over the existing shallow soils and exposed impermeable basaltic bedrock surfaces upon which the golf course turf will be established.

The application estimated the irrigation requirement of the 100 acres of fairways and 21 acres of golf greens to average about 500,000 gpd between April 15 and September 15 resulting in no more than 12-inches of the total annual irrigation demand being supplied by reuse water. Initially lake water will constitute the majority of the water used for irrigation. As the reuse volume increases to the 130,000 gpd design capacity, the Class A wastewater is expected to constitute no more than half of the total irrigation needs of the golf course.

BUFFER ZONES: No specific buffer zones will be imposed as indicated for Class A reuse. Application of irrigation waters to the golf course will be done during periods of non use by the public.

GROUND WATER MONITORING: No ground water monitoring will be required. However, Part I of the permit requires that ground water quality shall be in compliance with Idaho *Ground Water Quality Rule* IDAPA 58.01.11 as demonstrated by maintenance of existing drinking water quality in the two ground water supply wells serving the Arrow Point public drinking water system.

MONITORING:
Flow: The permit requires the Class III operator to monitor flows daily from equalization to headworks and through the effluent pump station into the Golf Course Irrigation Pond. Whenever waste sludge is pumped into the sludge storage tank or wastewater is returned from the Bypass pond for re-treatment, these volumes are required to be recorded. This data should allow for a water balance accounting to be maintained keeping track of all wastewater flows.

Turbidity: A continuous recording turbidimeter will be operated on the membrane discharge line that will automatically alert the operator of turbidity violations and divert the treated wastewater flow to the Bypass pond.

Disinfection: UV disinfection followed by chlorination will be used. A continuous recording chlorine residual analyzer has been installed at the Golf Course Irrigation Pond. If chlorination is employed, this monitor can alert the operator if chlorine residual falls below a target concentration. Daily total coliform sampling of the effluent following UV disinfection is required. If the bacteria samples violate the total coliform standards, treated wastewater must be diverted to the Bypass Pond until the bacteria standards are reestablished.

Quality: The pH of the treated wastewater will be monitored once daily (6 to 9 required), the BOD5 will be composite sampled weekly (10 mg/l or less monthly mean required), and total nitrogen concentration will be measured weekly by composite sampling (30 mg/l or less monthly mean required).

Standby power is required to operate the plant during power outages. No grazing or cropping is allowed. All reuse water accessible by the public must be proper signed as reclaimed wastewater that cannot be consumed.

RECOMMENDATION: The Staff Analysis and draft Reuse Permit for Gozzer Ranch are recommended for distribution to the permittee and others for a 30-day (or less) comment period. Following resolution of these comments, the draft permit will be posted for public review and comment for another 30 day period after which the permit can be executed by DEQ assuming public comments do not result in significant draft permit changes.

cc: Wastewater Reuse File No. LA-000143-01